CLAIMS

1. A process for producing a chimaeric viral vector comprising;

culturing a host cell which comprises one or more Simian Immunodeficiency Virus (SIV) nucleic acid sequences capable of producing an SIV capsid and which further comprises a vector comprising a Human Immunodeficiency Virus type 2 (HIV-2) packaging signal and a heterologous nucleic acid sequence;

said vector being packaged in the SIV capsid to produce a chimaeric virus comprising the heterologous nucleic acid sequence.

2. A process according to claim 1 comprising infecting the host cell with the vector which comprises the human Immunodeficiency Virus type 2 (HIV-2) packaging signal and a heterologous nucleic acid sequence.

3. A process according to claim 1 comprising infecting the host cell with a first vector which comprises the one or more Simian Immunodeficiency Virus (SIV) nucleic acid sequences capable of producing an SIV capsid and a second vector which comprises the human Immunodeficiency Virus type 2 (HIV-2) packaging signal and a heterologous nucleic acid sequence.

4. A process for producing a Simian Immunodeficiency Virus (SIV) encoding a heterologous gene, which process comprises infecting a host cell with a first vector which is capable of producing SIV capsid and a second vector comprising a Human Immunodeficiency Virus type 2 (HIV-2) packaging signal sufficient to package the vector in the SIV capsid and a heterologous gene capable of being expressed by the vector; and culturing the host cell.

5. A process according to claim 3 or 4 wherein the first vector is a SIV vector comprising a mutation within an SIV packaging signal such that viral RNA is not packaged within an SIV capsid.

6. A process according to claim 5 wherein the first vector is a packaging defective SIV vector

7. A process according to claim 5 or claim 6 wherein said mutation comprises a deletion in the region between the primer binding site and the 5' major splice donor site of SIV.

8. A process according to claim 9 wherein said mutation comprises a deletion within the DIS structure.

9. A process according to claim 7 or claim 8 wherein said mutation comprises a deletion of:

a sequence of SEQ ID NO: 2;

a fragment thereof of 5 or more nucleotides in length; or

a variant of either thereof.

10. A process according to claim 9 wherein said mutation comprises a deletion in the region of nucleotides 53 to 85 of SEQ ID No 2

11. A process according to any one of claims 5 to 10 wherein said mutation comprises a deletion in the region between the 5' major splice donor and the *gag* initiation codon

12. A process according to claim 11 wherein said mutation comprises a deletion of:

a sequence of SEQ ID NO: 3;

a fragment thereof of 5 or more nucleotides in length; or

a variant of either thereof.

13. A process according to any one of claims 3 to 12 wherein the first vector does not comprise replication-competent SIV.

14. A process according to any one of the preceding claims wherein the SIV capsid comprises an envelope protein from a retrovirus other than SIV

15. A process according to claim 14 wherein the nucleic acid sequence encoding the envelope protein from a retrovirus other than SIV is operably linked to an 5'LTR sequence from the same retrovirus

16. A process according to any one of claims 3 to 15 wherein said second vector comprises:

(a) a sequence of SEQ ID no 1 or a variant thereof,

(b) an internal fragment thereof of 5 or more nucleotides in length, or

(c) a fragment thereof of 17 or more nucleotides in length.

17. A process according to any one of claims 3 to 16 wherein said second vector comprises the matrix (MA) region of the gag ORF or a fragment thereof.

18 A process according to any one of claims 3 to 17 wherein said second vector comprises nucleic acids 553 to 912 of HIV-2 RNA or a fragment thereof.

19. A process according to any one of claims 3 to 18 wherein the second vector is replication deficient.

20. A process according to one of claims 3 to 19 wherein the second vector comprises one or more nucleic acid sequences from the 5' and 3' LTRs of HIV-2, which direct the expression and reverse transcription of the second vector and the integration of the second vector into the genome of a target cell.

21. A process according to claim 20 wherein the second vector comprises a mutation in the U3 region of the 3' LTR of the vector, said mutation being copied during reverse transcription such that the long terminal repeat promoter is inactivated

22. A process according to any one of claims 3 to 21 wherein the second vector comprises a promoter region operably linked to the heterologous gene or nucleic acid sequence.

23. A process according to any one of claims 3 to 22 wherein the said first and/or second vector are integrated into the genome of the host cell.

24. A process according to any one of claims 3 to 22 wherein the said first and/or second vector are extra-chromosomal in the host cell.

25. A process according to any one of the preceding claims wherein the heterologous gene or nucleic acid sequence encodes a therapeutic protein or peptide, an antigen protein or peptide.

26. A process according to any one of the preceding claims comprising isolating and/or purifying the virus comprising the heterologous nucleic acid sequence.

27. A process according to any one of the preceding claims comprising formulating the virus comprising the heterologous nucleic acid sequence with a pharmaceutically acceptable excipient.

28. A process according to any one of the preceding claims wherein the virus is suitable for infection of human and non-human primate cells.

29. A process for making a producer cell for the generation of chaemeric virus comprising:

infecting a host cell which comprises one or more Simian Immunodeficiency Virus (SIV) nucleic acid sequences capable of producing an SIV capsid, with a vector comprising a Human Immunodeficiency Virus type 2 (HIV-2) packaging signal and a heterologous nucleic acid sequence.

30. A process according to claim 29 wherein the host cell is infected with a first vector which comprises the one or more Simian Immunodeficiency Virus (SIV) nucleic acid sequences capable of producing an SIV capsid

31. A process according to claim 29 or claim 30 comprising isolating and/or purifying the infected cell.

32. A process according to any one of claims 29 to 31 comprising culturing said infected cell.

33 A virus produced by a process of any one of claims 1 to 28.

34. A virus according to claim 33 which is capable of infecting human and non-human primate cells.

35. A host cell infected with a first vector which is capable of producing SIV capsid and a second vector comprising a Human Immunodeficiency Virus type 2 (HIV-2) packaging signal sufficient to package the vector in the SIV capsid and a heterologous gene capable of being expressed by the vector

36. A host cell produced by a process of any one of claims 29 to 32.

37. A host cell according to claim 35 or claim 36 which is a human or non-human primate cell.

38. A vector system comprising a first vector which is capable of producing SIV capsid and a second vector comprising a Human Immunodeficiency Virus type 2 (HIV-2) packaging signal sufficient to package the vector in the SIV capsid and a cloning site suitable for insertion of a heterologous gene capable of being expressed by the vector.

39. A vector system according to claim 38 wherein a heterologous gene is inserted into the cloning site.

40. A kit comprising a first vector which is capable of producing SIV capsid and a second vector comprising a Human Immunodeficiency Virus type 2 (HIV-2) packaging signal sufficient to package the vector in the SIV capsid and a cloning site suitable for inserted of a heterologous gene capable of being expressed by the vector.

41. A method of producing a pharmaceutical composition for use in gene therapy comprising;

producing a virus by a process of any one of claims 1 to 28, and;

formulating the virus with a pharmaceutically acceptable excipient.

42. A pharmaceutical composition comprising a virus according to claim 33 or 34, a vector system according to claim 38 or 39 or a host cell according to any one of claims 35 to 37, and a pharmaceutically acceptable carrier.

43. A virus according to claim 33 or 34, a vector system according to claim 38 or 39 or a host cell according to any one of claims 35 to 37 for use in gene therapy of a human or non-human primate.

44. Use of a virus according to claim 33 or 34, a vector system according to claim 38 or 39 or a host cell according to any one of claims 35 to 37 in the manufacture of a medicament for use in gene therapy.

45. Use according to claim 44 wherein the medicament is for use in a human or non-human primate.

46. Use according to claim 44 or 45 wherein the gene therapy is for the treatment of Parkinson's disease or nerve injury.

47. Use of a packaging-defective SIV provirus infected cell line in a method of introducing a heterologous nucleic acid sequence into a mammalian cell, wherein said heterologous gene sequence is comprised in an HIV-2 vector which further comprises an HIV-2 packaging signal.

48. Use according to claim 47 wherein the mammalian cell is a human or non-human primate cell.

49. A method of delivering a therapeutic or antigenic protein or peptide to an individual comprising;

administering to the individual an effective amount of a virus according to claim 33 or 34, a vector system according to claim 38 or 39, a host cell according to any one of claims 35 to 37, or a pharamaceutical composition of claim 42.

50. A method according to claim 49 wherein the individual is a human or non-human primate.

51. A method of transfecting a cell with a heterologous nucleic acid sequence comprising;

producing a virus by a process according to according to any one of claims 1 to 28, and;

contacting the virus with a target cell.

52. A method according to claim 51 wherein the target cell is a human or non-human primate cell.

53. A method according to claim 51 or claim 52 wherein the cell is a CNS cell.

54. A method according to claim 53 wherein the cell is a glial cell, astrocyte, or neural stem cell.

55. A method of determining the biosafety of an agent comprising;

administering to a non-human primate an effective amount of an agent selected from the group consisting of: a virus according to claim 33 or 34, a vector system according to claim 38 or 39 or a host cell according to any one of claims 35 to 37, or a pharamaceutical composition of claim 42,

and determining the effect of said administration on the primate.

56. A method according to claim 55 wherein the non-human primate is a macaque or baboon.